REMARKS

Applicant submits this Amendment "E" and Response with an RCE for the Examiner's consideration. Reconsideration of the application in view of the following remarks is respectfully requested.

1. STATUS OF THE CLAIMS

Claims 1, 2, 4, 6-15, and 39-48 were presented for examination, and they stand rejected and pending in the application. The rejections asserted in the Office Action are addressed herein.

2. RESPONSE TO REJECTIONS

2.1. *Claim Rejections Under 35 U.S.C. § 102(b)*

Claims 1 and 10 stand rejected under 35 U.S.C. § 102(b) in view of Hamilton, U.S. Pat. No. 4,900,948 (hereinafter "Hamilton") as indicated in the Office Action.

Claim 1 recites, *inter alia*, a portion of an electrically insulative substrate "having a planar surface, said planar surface being part of a substrate outermost surface for receiving thereover a semiconductive device ... and an electrical conductor on the planar surface of the portion of the electrically insulative substrate, the electrical conductor having a receiving end on the planar surface of the portion of the electrically insulative substrate for connecting to a semiconductive device at electrically conductive terminals of said semiconductive device and such that at least some of said terminals are located in the region between said semiconductive device and said outermost surface of said substrate".

Claim 10 recites, *inter alia*, an electrical conductor on a portion of a sheet, the "sheet having an outermost surface for receiving thereon a semiconductive device", and "the electrical conductor having a receiving end on said portion for connecting to a semiconductive device at electrically

conductive terminals of said semiconductive device such that at least some of said terminals are located in the region between said semiconductive device and said outermost surface of said sheet".

In contrast, Hamilton discloses burn-in board assembly 40 with generally planar circuit board or card 60 and circuit packages or components 61. Neither the circuitry shown in the figures nor the written description for such figures in Hamilton discloses electrical conductors with features such as those recited in claims 1 and 10.

Furthermore, claim 1 recites, *inter alia*, a coupling of the substrate with an electric apparatus that "structurally supports said substrate with said terminal in electric contact with said electric apparatus." Claim 10 recites, *inter alia*, a coupling of a sheet to an electric apparatus that "structurally supports said sheet with said terminal end in electric contact with said electric apparatus." In contrast, Hamilton discloses board assembly 40 with circuit board or card 60 that is supported by guide members 27 along bottom wall 26, where such guide members are configured for receiving the edges of burn-in boards 60. *See, e.g.*, Hamilton, Figs. 3-4, col. 4, *ll,* 43-47, 61-63.

For a single reference to establish a *prima facie* case of anticipation, such reference must teach each of the claimed elements arranged as in the claim(s), and the teachings that satisfy such requirements must be enabling. Because of at least any one of the differences set forth above, Applicant respectfully submits that Hamilton does not satisfy these requirements and therefore does not anticipate claims 1 and 10. Applicant respectfully requests the reconsideration and withdrawal of this rejection.

2.2. ***Claim Rejections Under 35 U.S.C. § 103(a)***

The following claims:

Dependent claims 2, 4, 6-9 (dependent from independent claim 1); and

dependent claims 11-12 (dependent from independent claim 10);

stand rejected under 35 U.S.C. § 103(a) as obvious over Hamilton as indicated in the Office Action.

Applicant incorporates herein the reasoning set forth above with respect to claims 1 and 10.

Hamilton addresses the problem of "connecting discrete circuit packages for burn-in in an automatic burn-in environment system requiring a large number of connections to a burn-in board using standard connectors and environmental chambers." Hamilton, col. 1, *ll.* 7-11. Hamilton discloses the use and some features of "an auxiliary board [that] is mounted on a main burn-in board which has [] circuit packages, ... but is spaced from the main burn-in board and extends parallel to the main board." *See, e.g.*, Hamilton, Figs. 4-5, col. 2, *ll.* 66-68, col. 3, *ll.* 1-7. This problem is not reasonably pertinent to the particular problem with which the presently claimed interposers are concerned. The present claims are directed to interposers that have structural and constitutive features such that they provide solutions to heat dissipation, heat capacity compatibility, and shear stress related problems while having certain structural and connection features as recited in the claims. In seeking to solve such problems, one of ordinary skill in the art would not reasonably be expected or motivated to look in the field of providing a large number of connections for discrete circuit packages with auxiliary boards. As such, Hamilton addresses nonanalogous problems. Furthermore, as reasoned below, even if Hamilton addressed analogous problems, Hamilton does not disclose presently recited structural features, presently recited constitutive materials, and there is no suggestion on how to modify the teachings in Hamilton, or suggestion of motivation for doing so, to arrive at the claimed interposers with any expectation of success.

Hamilton does not teach or suggest any material as recited in the present claims. In contrast, Hamilton merely indicates that circuit board or card 60 "is made of a suitable material". *See, e.g.*, Hamilton, col. 5, *ll.* 58-59. Hamilton does not address the problems related to the materials comprised in the substrate and the sheet recited in the present claims. Furthermore, Hamilton does

not teach or suggest how to select such materials in light of problems such as thermal expansion compatibility and heat dissipation. Hamilton does not provide an indication of any expectation of success regarding the claimed interposers.

Claim 4 recites, *inter alia*, "wherein the receiving end protrudes upwardly with respect to the substrate." The antecedent basis in claim 1 for the "receiving end" establishes that such receiving end is a receiving end of the electrical conductor recited therein. The Office Action indicates with respect to claim 4 that "it appears that the receiving end protrude[s]] upwardly with respect to the substrate." Applicant fails to find any disclosure in Hamilton concerning the properties and characteristics of a receiving end such as that recited in claim 4.

Claim 8 recites, *inter alia*, "wherein the interposer further comprises an electrically insulating layer on a portion of the conductor between the receiving end and the terminal end." Applicant fails to find any disclosure in Hamilton concerning an electrically insulating layer such as that recited in claim 8.

Hamilton does not teach or suggest the claimed interposers, it does not provide any suggestion on how to modify its teachings to arrive at the claimed interposers, and it does not provide any motivation to modify its teachings to arrive at the claimed interposers. Given the structural differences between the embodiments disclosed in Hamilton and the claimed interposers, the embodiments disclosed in Hamilton would have to be significantly modified to arrive at the presently recited features of the claimed interposers. There is not suggestion or indication that such modifications could be performed in light of the ordinary skill in the art absent the teachings provided by the present Application. Because of differences and limitations such as those described hereinabove, Hamilton has not suggested the claimed interposers, and it may not be asserted that the teachings in Hamilton are sufficient for one of ordinary skill in the art to make the substitutions,

combinations or other modifications that are necessary to arrive to the claimed interposers. Applicant respectfully submits that Hamilton does not establish a *prima facie* case of obviousness and therefore requests the reconsideration and withdrawal of this rejection.

Claims 13-15 and 39-48 stand rejected under 35 U.S.C. § 103(a) as obvious over Ping, *et al.*, U.S. Pat. No. 5,659,245 (hereinafter "Ping") as indicated in the Office Action.

Claim 13, for example, recites, *inter alia*, an electrically insulating sheet "having a portion that has a uniform thickness" and "an electrical conductor on said portion, the electrical conductor having ... a terminal end on said portion for connecting to an electrical apparatus". The rest of the claims rejected in view of Ping contain variations of this language with respect to a sheet or a substrate.

Ping, in contrast, describes a printed circuit board 10 that does not have the characteristics and features of the claimed interposers. Printed circuit board 10 has a plurality of wiring traces 70, 75, 80, and 85. The ends of these wiring traces that are opposite to the ends of the same wiring traces that are connected to IC modules mounted onto printed circuit board 10 do not have the features of being terminal ends of the wiring traces that are on the same portion of the printed circuit board 10 and that connect to an electrical apparatus. These ends of wiring traces 70, 75, 80, and 85 are, in contrast with the claimed interposers, connected to another element which is connector 30. This element provides coupling to external sources, monitor, and reference equipment through connector terminals. *See, e.g.*, Ping, col. 3, *ll.* 36-50, and Figs. 1-2.

Ping does not teach or suggest the types features related to the connectivity between an interposer and a semiconductive device as in the claimed interposers. In contrast, Ping addresses the problem of electrostatic discharge and electromagnetic interference and the design of printed circuit boards with circuits that suppress such discharge and interference. *See, e.g.*, Ping, col. 1, *ll.* 6-12.

This problem is not reasonably pertinent to the particular problems with which the presently claimed interposers are concerned. As noted with respect to Hamilton, Ping does not address problems related to thermal expansion compatibility between a semiconductive device and an interposer, heat dissipation by an interposer, and severance of the connection between an interposer and a semiconductor device by shear stress. In seeking to solve these problems, one of ordinary skill in the art would not reasonably be expected or motivated to look into the field of electrostatic discharge and electrostatic interference suppression. As such, Ping addresses nonanalogous problems.

Neither Ping nor Hamilton teaches or suggests structures and materials that successfully address the problems with which the presently claimed interposers are concerned. In addition to not teaching or suggesting all the recited elements of the claimed interposers, neither Hamilton nor Ping teaches or suggests the modifications that should be made to the structures described therein to arrive at the claimed interposers. Furthermore, these references do not teach or suggest the motivation for any such modifications or the expectation of success derived from the claimed interposers. In light of this lack of teachings, and as reasoned with respect to Hamilton, it may not be asserted that the teachings in Ping are sufficient for one of ordinary skill in the art to make the substitutions, combinations or other modifications that are necessary to arrive to the claimed interposers.

The Office Action asserts that "the material for the substrate of Hamilton such as glass (alumina) "Nitride", "nonmetallic Nitride", "Carbide" or "nonmetallic carbide" would have been well-known material[s] and also alternative materials" and that "different insulative materials for the substrate such as glass (alumina) "Nitride", "nonmetallic Nitride", "Carbide" or "nonmetallic carbide" would have been a well-known material and also alternative materials." Office Action, p. 3, item 4, p. 5, item 5.

Applicant respectfully notes that the recited materials are not mere arbitrary choices amongst known materials for the manufacture of substrate or sheets for the claimed interposers. Support for this statement is provided by the following cites and quotes to the Application, which are provided by way of illustration, but not as interpretive limitations.

As indicated in the Application, fiberglass and epoxy resins are conventional materials for interposer substrates. However, such interposers have thermal expansion coefficients that are incompatible with typical semiconductive devices, and this incompatibility leads to the development of shear stress at the interface between the interposer and the semiconductive device when the semiconductive device becomes hot. This stress can furthermore lead to the severance of the interposer-semiconductive device connection. *See, e.g.*, Application, p. 3, *ll.* 10-26. Some conventional interposer materials also lead to interposer degradation. *See, e.g.*, Application, p. 4, *ll.* 1-2. In addition, some conventional interposer materials do not dissipate sufficient heat to protect semiconductive devices from the heat that they generate when they are in use. *See, e.g.*, Application, p. 3, *ll.* 15-17. These problems are not successfully addressed by material availability and material cost considerations.

As indicated in the Application, recited materials and/or a combination of such materials with recited structural features lead to the prevention of such problems. *See, e.g.*, Application, p. 5, *ll.* 13-18, p. 8, *ll.* 11-22, 25-26, p. 9, *ll.* 1-25. Applicant respectfully submits that the art of record does not teach or suggest interposers that address such problems with the recited structural and compositional features.

Consequently, Applicant respectfully submits that neither Hamilton nor Ping supports a *prima facie* case of obviousness regarding the present claims. Applicant respectfully requests the reconsideration and withdrawal of this rejection.

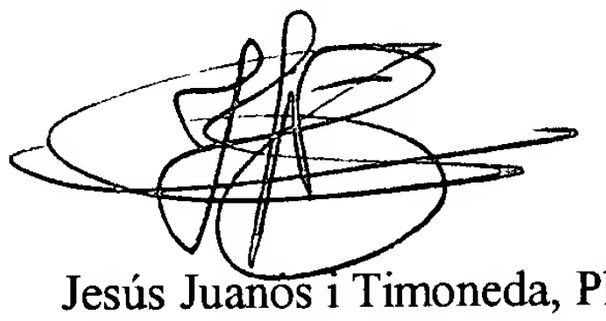
3. CONCLUSIONS

In view of the above, Applicant respectfully maintains that the present application is in condition for allowance. Reconsideration of the rejections is requested. Allowance of the pending claims at an early date is solicited.

In the event that the Examiner finds any remaining impediment to a prompt allowance of this application which could be clarified by a telephonic interview, or which is susceptible to being overcome by means of an Examiner's Amendment, the Examiner is respectfully requested to initiate the same with the undersigned attorney.

Dated this 11th day of March 2002.

Respectfully submitted,



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Marked up Version of the Pending Claims Under 37 C.F.R. § 1.121(c)(1)(ii):

Applicant submits the following marked up version only for claims being changed by the current amendment, wherein the markings, if any, are shown by brackets (for deleted matter) and/or underlining (for added matter): No claims have been amended in this Paper.